(1) Find the inverse

(a) $y = \sqrt[3]{x+5}$

$x = \sqrt[3]{y+5}$

$x^3 = y+5$

$-5 \quad -5$

$y = x^3 - 5$

(b) $y = \arctan\left(\frac{x}{3}\right)$

$\tan x = \tan\left(\arctan\left(\frac{y}{3}\right)\right)$

$\tan x = \frac{y}{3}$

$y = 3\tan x$

(2) Find the domain/range and evaluate at $x = 1$

(a) $y = \sin^{-1}(x)$

(b) $y = \arccos(x)$

(c) $y = \tan^{-1}(x)$

(d) $y = \sec^{-1}(x)$

(e) $y = \tan\left(\arctan(x)\right)$

(23) $y = \sec^{-1}(x)$ at $x = 2$

$$y' = \frac{1}{|x|\sqrt{x^2-1}} \text{ at } x = 2 \Rightarrow \frac{1}{2\sqrt{2^2-1}}$$

tangent $= \frac{\sqrt{3}}{6}(x-2) + \frac{\pi}{3}$

$L(x) = f'(a)(x-a) + f(a)$ $\Rightarrow$ $\frac{1}{2\sqrt{3}} \Rightarrow \frac{\sqrt{3}}{6}$ slope

Orig point $\left(2, \frac{\pi}{3}\right)$

$\sec^{-1}(x) = \cos^{-1}\left(\frac{1}{x}\right)$

$y = \sec^{-1}(2)$

$\cos^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{3}$

- Derivatives were exponential and rate of growth is the base

- $\frac{\text{Derivative}}{\text{over } f(x)} = \text{constant} = \ln(\text{base})$

x	e^x	$\frac{d}{dx}e^x$
1	2.718	2.718
2	7.389	7.389
3	20.086	20.086
4		

$$\frac{d}{dx}e^x = e^x$$

Simplify

$3\ln x - \ln 3x + \ln(12x^2)$

$\ln x^3 - \ln 3x + \ln(12x^2$

$\ln\left(\frac{x^3 \cdot 12x^2}{3x}\right) = \ln(4x^4)$

Solve

(a) $3^x = 19$ (ln)

$x \ln 3 = \ln 19$

$x = \frac{\ln 19}{\ln 3}$

≈ 2.68

(b) $5^t \ln 5 = 18$ (1.6)

$5^t = \frac{18}{\ln 5}$

$t = \frac{\ln\left(\frac{18}{\ln 5}\right)}{\ln 5}$

≈ 1.5

(c) $3^{x+1} = 2^x$

$\ln 3^{x+1} = \ln 2^x$

$(x+1)\ln 3 = x \ln 2$

$x \ln 3 + \ln 3 - x \ln 2 = 0$

$x(\ln 3 - \ln 2) + \ln 3 = 0$

$x = \frac{-\ln 3}{\ln 3 - \ln 2}$

Homework

* Read and understand 3.9 - bring ?'s

- If you need to, do some (more) 3.8

- Look over Q.R. 3.9 (Do)